

REMARKS

Claim 200 has been amended. Claims 124-137, 170-188, and 200-209 remain pending. Claims 124-137 and 170-188 are withdrawn from consideration. Applicant reserves the right to pursue the original claims and other claims in this and other applications. Please reconsider the above-referenced application in light of the foregoing amendment and following remarks.

Claims 200-204, 206, and 209 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Yamada et al., U.S. Patent No. 5,223,726 ("Yamada"). The rejection is respectfully traversed.

Claim 200 recites a method of forming a photosensor comprising the steps of "excavating a trench . . . having a substantially vertical internal surface region and bottom surface region; performing a first ion implantation . . . at a first ion implantation angle; performing a second ion implantation . . . at a second ion implantation angle; forming an insulating layer that covers the vertical internal surface region and bottom surface region of said trench; and forming a conductive layer that covers a substantial portion of said insulating layer."

Applicant respectfully submits that Yamada does not disclose performing a first *and* second ion implantation with different angles into a trench. In FIGs. 5(a)-5(k), Yamada teaches that "p conductivity type impurities are ion implanted to the trench hole in the opposite directions *each* perpendicular to the charge transfer direction." (Col. 5, line 67-Col. 6, line 2) (emphasis added). Even if Yamada discloses more than one ion implantation, *each* of Yamada's ion implantations would be conducted in a perpendicular direction to the charge transfer direction. Claim 200, in contrast, recites

“performing a first ion implantation . . . *at a first ion implantation angle*; performing a second ion implantation . . . *at a second ion implantation angle*.” (emphasis added).

Nonetheless, to expedite prosecution, claim 200 has been amended to recite the act of “forming an insulating layer that covers [a] vertical internal surface region and bottom surface region of [a] trench; and forming a conductive layer that covers a substantial portion of [the] insulating layer.” Support for this claim amendment is found in Applicant’s FIGs. 10-11. Yamada does not disclose both an insulating layer that covers the vertical internal surface region and bottom surface region of a trench, and a conductive layer that covers a substantial portion of the insulating layer. As such, claim 200 is allowable over Yamada.

Claims 201-204, 206, and 209 depend from claim 200 and are allowable along with claim 200 for at least the reasons provided above. Moreover, Yamada does *not* disclose that the “first implantation angle is *orthogonal* to said second ion implantation angle,” as recited in dependent claim 201 (emphasis added). As indicated above, Yamada, at best, discloses the ion implantation angles that are in a perpendicular direction to the charge transfer direction. This is an additional reason for the allowance of claim 201.

Accordingly, Applicant respectfully submits that the rejection should be withdrawn and the claims allowed.

Claims 205, 207, and 208 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamada in view of alleged admitted prior art. The rejection is respectfully traversed.

Claims 205, 207, and 208 depend from claim 200 and are allowable along with claim 200 for at least the reasons provided above. For instance, Yamada does not disclose “performing a first ion implantation . . . *at a first ion implantation angle*; performing a second ion implantation . . . *at a second ion implantation angle*,” as recited in claim 200, much less “forming an insulating layer that covers [a] vertical internal surface region and bottom surface region of [a] trench; and forming a conductive layer that covers a substantial portion of [the] insulating layer,” as also recited in claim 200. At best, *each* of Yamada’s ion implantations would be conducted in a perpendicular direction to the charge transfer direction. Yamada is completely silent about an insulating layer that covers the vertical internal surface region and bottom surface region of a trench, and does not disclose a conductive layer that covers a substantial portion of the insulating layer.

The alleged admitted prior art is relied upon for disclosing that BPSG, PSG, or BSG are well-known materials for passivating a device and CMP is a well-known planarizing method. The admitted prior art adds nothing to rectify the deficiencies associated with Yamada. As a result, the § 103(a) rejection of claims 205, 207, and 208 should be withdrawn and the claims allowed.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to review and pass this application to issue.

Application No. 10/825,372
Amendment dated March 2, 2006
Reply to Office Action of December 13, 2005

Docket No.: M4065.0105/P105-C

Dated: March 2, 2006

Respectfully submitted,

By 

Gianni Minutoli

Registration No.: 41,198
DICKSTEIN SHAPIRO MORIN &
OSHINSKY LLP
2101 L Street NW
Washington, DC 20037-1526
(202) 785-9700
Attorney for Applicant